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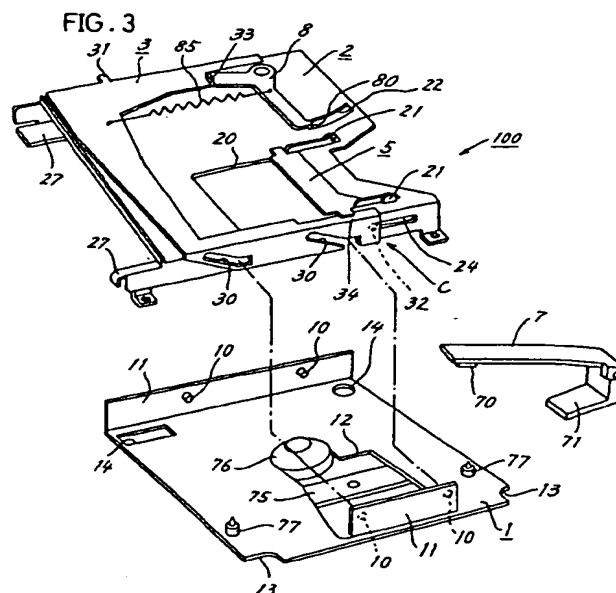
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### (54) Recording device for disk contained in cartridge

(57) A disk recording device has inside a cabinet 4 a mechanical deck 100 comprising an inner holder 2 for horizontally holding therein a cartridge 6 containing a disk 60, a chassis 1 movable toward and away from the inner holder 2 and provided with a pickup 75 for projecting a beam on the disk, and an outer holder 3 provided over the inner holder 2 and slidable along the direction of insertion of the cartridge. The inner holder 2 is fixed to the cabinet 4 through holes 14 and cutouts 13 formed in the chassis 1, and the chassis 1 is movable upward and downward relative to the inner holder 2. A space 44 for accommodating the pickup 75 is formed between the lower surface of the chassis 1 and the bottom surface of the cabinet 4 when the chassis 1 is in a completely lowered position.



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## Description

## FIELD OF THE INVENTION

The present invention relates to a device for recording data on a disk as accommodated in a cartridge.

## BACKGROUND OF THE INVENTION

A recording medium is already in use which comprises a disk 60 accommodated in a rectangular cartridge 6 formed at a side portion thereof with a window 62 for exposing the disk as shown in FIGS. 20, (a) and (b) (see JP-A No. 298799/1993). The window 62 is opened or alternatively closed with a shutter 61 which is slidable on the cartridge 6. The shutter 61 has a side wall formed with a small hole 63. The cartridge 64 has a first slit 64 formed in a side wall thereof where the shutter 61 is provided, and a second slit 65 in another side wall thereof opposite to the shutter 61. The shutter 61 is engaged with the cartridge 6 by a lock mechanism (not shown). When the cartridge 6 is inserted into a recording device, an unlocking piece 29 in the recording device advances into the first slit 64, unlocking the shutter 61 and pushing the shutter open.

FIG. 21 is a side elevation showing the relationship in position between a mechanical deck 100 for receiving the cartridge 6 as inserted and a cabinet 4 housing the deck 100. The cabinet 4 has a front opening which is provided with a pivotal panel 42 pivoted at its upper end to the cabinet 4. The cartridge 6 is inserted into the mechanical deck 100 while opening the pivotal panel 42.

FIG. 17 is an exploded perspective view of the mechanical deck 100. In the following description, the side of the deck 100 at which the cartridge 6 is delivered from the deck 100 will be referred to as the "delivery side," the direction in which the cartridge advances as "forward," and the direction in which the cartridge is delivered as "rearward." The mechanical deck 100 comprises the combination of an inner holder 2 into which the cartridge 6 is inserted from the front opening, and an outer holder 3 covering the upper side of the inner holder 1. The combination is mounted on a chassis 1, which is secured to the bottom wall of the cabinet 4.

A pickup 75 and turntable 76 are provided on the chassis 1 as well known. A head lever 7 biased downward and carrying a recording head 70 at its distal end is attached by a bracket 71 to the pickup 75. The head lever 7 is moved upward and downward by a head lift mechanism (not shown) mounted on the chassis 1.

A kickout lever 8 having a cutout 86 formed in a peripheral edge portion thereof is pivotally supported on the upper side of the inner holder 2. Disposed forwardly of the kickout lever 8 is a stopper piece 17 provided upright on the chassis 1. The kickout lever 8 is biased by a tension spring 85 toward the cartridge delivery side into contact with a stopper 210 on the upper side of the

inner holder 2.

The kickout lever 8 has one end bent downward to provide a push lug 80 pushable by the cartridge 6. The outer holder 3 is provided over the inner holder 2. Pins 220, 220 projecting from each of opposite side walls of the inner holder 2 are fitted in cam slots 30 formed obliquely in a side wall of the outer holder 3. Projections 37 project outward from each of opposite side walls of the outer holder 3. One of these side walls has a grip 31 projecting outward and to be pulled by the user when the cartridge 6 is to be delivered.

Each of opposite side walls of the chassis 1 has guide grooves 18 for the respective projecting pins 220 to fit in and horizontal slots 19 for the respective projections 37 to fit in. Each guide groove 18 has a horizontal portion 18a and a vertical portion 18b continuous therewith. A spring retainer 38 projects from the rear end of one side wall of the outer holder 3.

FIGS. 19 (a) and (b) are side elevations of the mechanical deck 100. A tension spring 9 extends from the spring retainer 38 to the chassis 1, biasing the outer holder 3 toward the direction of insertion of the cartridge 6.

FIGS. 18 (a) and (b) are plan views of the mechanical deck 100. When the cartridge 6 is inserted into the inner holder 2 in a standby state shown in FIG. 18 (a), the cartridge 6 pushes the push lug 80 against the tension spring 85, rotating the kickout lever 8 counterclockwise, whereby the cutout 86 of the lever 8 is opposed to the stopper piece 17, allowing the inner holder 2 to advance a distance corresponding to the depth of the cutout 86.

The inner holder 2 is provided inside thereof with a projecting piece (not shown) fittable in the second slit 65 of the cartridge 6. When the rear end of the second slitted portion 65 pushes the projecting piece on the inner holder 2, each projecting pin 220 on the inner holder 2 in the state shown in FIG. 19 (a) slidably moves along the horizontal portion 18a of the guide groove 18 to push the cam slotted portion 30 of the outer holder 3. The outer holder 3 pushed by the inner holder 2 has its projections 37 fitted into the respective horizontal slots 19 of the chassis 1 and slidably moves horizontally.

Upon each projecting pin 220 reaching the front end of the horizontal portion 18a, the inner holder 2 descends, and the pin 220 reaches the lower end of the vertical portion 18b as seen in FIG. 19 (b). The cartridge 6 descends while holding the kickout lever 8 in its pushed position. The inner holder 2 lies on the chassis 1 with the cartridge 6 placed therein. The outer holder 3 biased forward by the tension spring 9 biases the inner holder 2 forwardly downward through the projecting pins 220, biasing the cartridge 6 toward the turntable 76.

However, the conventional device has the following problems.

1. The chassis 1 is fixed to the cabinet 4, and the inner holder 2 is movable upward and downward

above the chassis 1. Since none of parts such as pickup 75 can be provided in the space for the inner holder 2 to pass through for upward and downward movement, a dead space corresponding to the amount of up-down movement of the inner holder 2 is formed inside the cabinet 4. The space presents an obstacle to a reduction in the thickness of the device.

2. The cartridge 6 is horizontally inserted into the cabinet 4 and then descends. If the distance of descent is small, therefore, the pivotal panel 42 is pushed open once by the cartridge 6 moving horizontally as shown in FIG. 22 (a) and is likely to be thereafter held semiopen by the cartridge 6 as loaded in position as shown in FIG. 22 (b). The semiopen panel 42 has a poor appearance, making the user feel as if the cartridge 6 were caught by an obstacle in the course of descent.

To eliminate this semiopen state, it is necessary to prevent the contact of the lower end of the pivotal panel 42 with the upper surface of the cartridge 6 by increasing the distance of descent of the cartridge 6 or lengthening the distance between the panel 42 and the mechanical deck 100. In either case, the device then becomes greater in size. Further there is a need to provide a mechanism for opening the panel 42 when the cartridge 6 is to be delivered. This requires a complex mechanism.

#### SUMMARY OF THE INVENTION

An object of the present invention is to provide a compacted recording device of reduced thickness for use with a cartridge as loaded therein.

An inner holder 2 is attached to a cabinet 4, and a chassis 1 positioned between the inner holder 2 and the cabinet 4 is movable upward and downward relative to the inner holder 2.

In this case, a space 44 for accommodating a pickup 75, etc. needs to be provided on the rear side of the chassis 1 (see FIG. 15). The chassis 1 moves upward and downward in this space 44. Thus, the space 44 for accommodating the pickup, etc. and the space for the upward and downward movement of the chassis 1 can be both provided under the chassis 1 to effectively utilize the interior space of the device. This reduces the thickness of the device.

The inner holder 2 to be loaded with the cartridge 6 does not move upward or downward. A pivotal panel 42 is held completely opened by contact with the upper surface of the cartridge 6 as loaded in the inner holder 2. Unlike the prior art, therefore, the invention eliminates the likelihood that the pivotal panel 42 will be held semiopen. Further because the pivotal panel 42 is not closed with the cartridge 6 loaded in position, it is possible to shorten the distance of up-down movement of the chassis 1 and also the horizontal distance from the piv-

otal panel 42 to the mechanical deck 100.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a cartridge and a cabinet;

FIGS. 2 (a) and (b) are side elevations showing the position of the cartridge and a pivotal panel relative to each other, (a) showing the same in a standby state, (b) showing the cartridge as loaded in place; FIG. 3 is an exploded perspective view of a mechanical deck;

FIG. 4 is a side elevation partly broken away and showing the deck as it is seen from the direction of arrow C in FIG. 3;

FIG. 5 is a perspective view of a head drive lever;

FIG. 6 is a perspective view of an inner holder;

FIG. 7 is a bottom view of the inner holder of FIG. 6;

FIG. 8 is a front view of the inner holder as it is seen from the direction of arrow A in FIG. 6;

FIG. 9 is a left side elevation of the inner holder as it is seen from the direction of arrow G in FIG. 6;

FIG. 10 is a plan view of the mechanical deck in a standby position;

FIG. 11 is a front view of the deck as it is seen from the direction of arrow B in FIG. 10;

FIGS. 12 (a) and (b) are plan views showing the cartridge as inserted in the deck;

FIGS. 13 (a) and (b) are side elevations of the mechanical deck in the standby position, (a) showing the position of the inner holder and an outer holder relative to each other, (b) showing the position of the head drive lever and a head lever relative to each other;

FIGS. 14 (a) and (b) are side elevations of the mechanical deck with the cartridge loaded in place, (a) showing the position of the inner holder and the outer holder relative to each other, (b) showing the position of the head drive lever and the head lever relative to each other;

FIG. 15 is a right side elevation partly broken away and showing the cabinet as it is seen from the direction of arrow E in FIG. 10;

FIG. 16 is a left side elevation of part of the cabinet as it is seen from the direction of arrow F in FIG. 10;

FIG. 17 is an exploded perspective view of a conventional disk recording-playback device;

FIGS. 18 (a) and (b) are plan views of a conventional mechanical deck, (a) showing the same in a standby position, (b) showing the same as loaded;

FIGS. 19 (a) and (b) are side elevations of the conventional mechanical deck, (a) showing the same in the standby position, (b) showing the same as loaded;

FIG. 20 (a) is a perspective view of a cartridge, and FIG. 20 (b) is a side elevation of the same as it is seen from the direction of arrow H in (a);

FIG. 21 is a side elevation showing the mechanical

deck and a cabinet relative to each other; and  
FIGS. 22 (a) and (b) are side elevations of the cartridge and the cabinet, (a) showing the cartridge being inserted into the cabinet; (b) showing the cartridge as inserted.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

An embodiment of the invention will be described below with reference to the drawings concerned.

FIG. 1 is a perspective view of a cartridge 6 and a cabinet 4. The cartridge 6 is inserted into an inlet 43 of the cabinet 4, with a shutter 61 positioned at the right side. A pivotal panel 42 for closing the inlet 43 is pivoted at its upper end to the inside of a cabinet upper edge defining the inlet 43. FIGS. 2 (a) and (b) are side elevations showing the position of the cartridge 6 and the pivotal panel 42 relative to each other. With the cartridge 6 inserted in the cabinet 4, the free end portion of the panel 42 is in bearing contact with the cartridge 6, whereby the panel 42 is held completely open as shown in FIG. 2 (b). A label bearing the name of data recorded is often affixed to the rear end face of the cartridge 6, enabling the user to identify the recorded data, with the cartridge 6 inserted in the cabinet 4.

#### [Detailed Description of Mechanical Deck]

FIG. 3 is an exploded perspective view of a mechanical deck 100 positioned inside the cabinet 4. The deck 100 comprises an inner holder 2 for receiving the cartridge 6 as inserted therein, and an outer holder 3 provided over the inner holder 2 and slidable in the direction of insertion of the cartridge. The outer holder 3 and the inner holder 2 are positioned over the chassis 1. The chassis 1 has a pickup 75 and a turntable 76 and is further provided with pins 77, 77 for supporting the bottom of the cartridge 6.

With the device of the present embodiment, the inner holder 2 to be loaded with the cartridge 6 is fixed as attached to the cabinet 4 as will be described below, and the chassis 1 moves upward and downward relative to the inner holder 2.

The chassis 1 is provided at its opposite sides with support walls 11, 11 each having inward projections 10, 10. The projections 10, 10 fit in the inner holder 2 and the outer holder 3. An opening 12 for exposing the pickup 75 is formed in the chassis 1 and positioned rightward of its center. Cutouts 13, 13 and holes 14, 14 are formed in the respective corners of the chassis 1. As will be described later, the inner holder 2 is attached to the cabinet 4 through the cutouts 13, 13 and the holes 14, 14.

A head lever 7 is attached as biased downward to the pickup 75 by a bracket 71, and carries a recording head 70 at its distal end.

The outer holder 3 shown in FIG. 3 is formed by

bending opposite side edges of a metal plate. Cam slots 30, 30 slanting downward along the direction of insertion of the cartridge are formed in each of side walls of the holder 3. The outer holder 3 has a projection 32 inwardly projecting from a front end portion thereof, and a grip 31 projecting outward from the left side wall thereof. The grip 31 is pulled toward the user for delivering the cartridge 6 from the deck.

A kickout lever 8 is pivotally supported at its base end on the upper surface of left end portion of the inner holder 2. The kick lever 8 has a free end bent downward to provide a push lug 80, which extends through a circular-arc slot 22 formed in the inner holder 2 to the inside thereof. As will be described later, the push lug 80 is pushed by the front end of the cartridge 6 when the cartridge 6 is inserted. A tension spring 85 extends from the outer holder 3 to the kickout lever 8, pressing the lever 8 into contact with a stopper 33 provided on the outer holder 3 in a standby state wherein no cartridge 6 is inserted in the inner holder 2.

#### [Head Lever Drive Mechanism]

The inner holder 2 has an aperture 20 for permitting the recording head 70 to pass therethrough, and is formed on its upper surface with lugs 21, 21 positioned to the front of the aperture 20. FIG. 4 is a side elevation of the deck 100 as it is seen from the direction of arrow C in FIG. 3, and FIG. 5 is a perspective view of a head drive lever 5.

With reference to FIG. 5, the head drive lever 5 comprises a contact plate 50 having pivots 51, 51 projecting outward from the base ends of opposite side portions thereof and supported by the respective lugs 21, 21. The contact plate 50 has a first contact piece 52 projecting from one of the plate side portions and in contact with the upper surface of the inner holder 2, and a second contact piece 53 projecting from the other side portion, raised from the plate 50 and in contact with the outer holder 3.

As shown in FIG. 4, the outer holder 3 is formed with a protrusion 34 so located as to come into contact with the second contact piece 53. When the second contact piece 53 is brought into contact with the protrusion 34 with the sliding movement of the outer holder 3 the head drive lever 5 is pushed up to pivotally move upward. The head lever 7 is biased downward about the pivot of the head lever 7 on the bracket 71 as previously stated, and the free end of the head lever 7 contacts the contact plate 50 of the head drive lever 5. When the deck 100 is in its standby position, the head drive lever 5 is in a raised position, permitting advance of the cartridge 6 as seen in FIG. 13 (b).

#### [Arrangement of Inner and Outer Holders and Chassis]

FIG. 6 is a perspective view of the inner holder 2, FIG. 7 is a bottom view of the same as it is seen from

below upward, FIG. 8 is a front view of the same as it is seen from the direction of arrow A in FIG. 6, and FIG. 9 is a left side elevation of the same as it is seen from the direction of arrow G in FIG. 6. The chassis 1 indicated in a chain line in FIG. 7.

As shown in FIG. 6, each of the side walls of the inner holder 2 has vertical slots 23, 23 opposed to the cam slots 30, 30 of the outer holder 3, and horizontal slots 24 having fitted therein the projections 32 of the outer holder 3 for guiding the horizontal sliding movement of the outer holder 3. When the inner holder 2 is loaded with the cartridge 6 and also when it is vacant, the aperture 20 of the inner holder 2 is not covered with the outer holder 3. Legs 25, 25 extend downward respectively from the front and rear ends of side wall of the inner holder 2 and have lower ends bent outward to provide mount portions 26. A threaded bore 26a is formed in each mount portion 26 centrally thereof.

As shown in FIGS. 7 and 8, the opposite side walls of the inner holder 2 are bent inward at their lower ends to provide support plates 27, 27 for supporting the cartridge 6 at its bottom. One of the support plates 27 has protuberances 28, 28 protruding toward the chassis 1. The protuberances 28, 28 are in register with the respective holes 14, 14 of the chassis 1.

With reference to FIGS. 6 and 8, the midportion of one side wall of the inner holder 2 is inwardly bent to provide an unlocking piece 29 which is movable into the first slit 64 of the cartridge 6. A spring 66 having a crest facing inward is provided inside the inner holder 2 to the rear of the unlocking piece 29.

As the cartridge 6 is inserted into the inner holder 2, the unlocking piece 29 shown in FIG. 20 (a) advances into the first slit 64, unlocking the shutter 61 and pushing the shutter 61 open. When the cartridge 6 is pulled out of the holder 2, the spring 66 fits into the small hole 63 in the shutter 61, closing the shutter as the cartridge 6 is moved toward the delivery direction. When the cartridge 6 is further pulled out as it is, the shutter 61 is released from the fitting engagement with the spring 66.

Inwardly projecting from the front end of the left side wall of the inner holder 2 shown in FIG. 9 is an engaging piece 200 fittable in the second slit 65 of the cartridge 6.

FIG. 10 is a plan view of the mechanical deck 100 as attached in its standby position to the cabinet 4, and FIG. 11 is a front view showing the deck 100 as it is seen from the direction of arrow B in FIG. 10. The kickout lever 8 is biased rearward by the tension spring 85, with the push lug 80 in contact with the rear edge of the circular-arc slotted portion 22 of the inner holder 2. The stopper 33 of the outer holder 3 is in contact with the kickout lever 8, which restrains the outer holder 3 from advancing.

Further as shown in FIG. 13 (a), the projections 10 of the chassis 1 are positioned at the lower ends of the respective cam slots 30 of the outer holder 3 and are in the lowermost position remotest from the inner holder 2. The head drive lever 5 is in its raised position as stated

above, holding the head lever 7 lifted as seen in FIG. 13 (b).

#### [Chassis Provided in Cabinet]

FIG. 15 is a side elevation in section showing the cabinet as it is seen from the direction of arrow E in the plan view of FIG. 10, and FIG. 16 is a side elevation in section of the same as it is seen from the direction of arrow F in FIG. 10. As shown in FIG. 15, the cabinet 4 has a boss 41 projecting therefrom and extending through the cutout 13 of the chassis 1 from therebelow upward. The inner holder 2 is supported by the boss 41. A screw 40 extends through the boss 41 from the underside of the cabinet 4 and is screwed into the mount plate 26 to fasten the inner holder 2 to the cabinet 4.

Further as seen in FIG. 16, the protuberance 28 of the inner holder 2 is in register with the hole 14 in the chassis 1, and fastened to the cabinet 4 with a screw 40 extending upward from the underside of the cabinet 4.

With the device of the present embodiment, the inner holder 2 is fixed to the cabinet 4, and the chassis 1 is movable upward and downward. Data is recorded on the disk, with the chassis 1 in a completely raised position.

#### [Insertion of Cartridge]

When the cartridge 6 is placed onto the support plates 27 of the inner holder 2 and pushed into the holder 2, with the mechanical deck 100 in its standby position shown in FIG. 10, the front end of the cartridge 6 pushes the push lug 80 of the kickout lever 8, rotating the lever 8 counterclockwise. The cartridge 6 slides along with the engaging piece 200 of the inner holder 2 fitting in the second slit 65 of the cartridge 6 (see FIG. 9).

FIGS. 12 (a) and (b) are plan views showing parts during the insertion of the cartridge 6 to its loaded position. With the cartridge 6 completely pushed in as seen in FIG. 12 (a), the rotation of the kickout lever 8 releases the stopper 33 therefrom, causing the outer holder 3 to be advanced by the tension spring 85 as shown in FIG. 12 (b). In this state, the shutter 61 on the cartridge 6 has already been opened by the unlocking piece 29, exposing the disk from the cartridge 6.

#### [Data Recording and Reproduction]

The advance of the outer holder 3 releases the second contact piece 53 of the head drive lever 5 from the protrusion 34 of the outer holder 3, allowing the lever 5 to move down as shown in FIG. 14 (b) and the downwardly biased head lever 7 also to pivotally move downward to bring the recording head 70 closer to the disk through the aperture 20.

Further as seen in FIG. 14 (a), the chassis 1 having its projections 10 fitted in the respective cam slots 30 is

biased upward and raised vertically upward along the vertical slots 23 of the inner holder 2 by the advance of the outer holder 3. The cartridge 6 has a thickness of about 5 mm. The upward stroke length of the chassis 1 is set to a distance smaller than the thickness of the cartridge 6 by the present applicant. The chassis 1 stops upon the projections 10 reaching the upper ends of the cam slots 30. The turntable 76 fits to the disk inside the cartridge 6, making it possible to record data on the disk.

The outer holder 3 is biased forward by the tension spring 85 and therefore forces the projections 10 to press the turntable 76 on the chassis 1 against the cartridge 6, whereby the disk 60 in the cartridge 6 is prevented from backlash relative to the turntable 76.

When the cartridge 6 is in its loaded position, the pivotal panel 42 shown in FIG. 2 (b) is left open with its rear end portion bearing on the upper surface of rear end portion of the cartridge 6 as previously stated. This enables the user to recognize the data name on the rear end face of the cartridge 6.

When the cartridge 6 is inserted into the device, the recording head 70 descends. The disk can be played back when no current is passed through the recording head 70.

#### [Delivery of Cartridge]

To deliver the cartridge 6 from the loaded position shown in FIG. 12 (b), the grip 31 of the outer holder 3 is pulled out by hand against the tension spring 85. The protrusion 34 of the outer holder 3 comes into contact with the second contact piece 53 of the head drive lever 5 to raise the head lever 7 as seen in FIG. 13 (b).

From the state shown in FIG. 14 (a), the projections 10 of the chassis 1 fitting in the respective cam slots 30 are urged downward, moving the chassis 1 downward along the vertical slots 23 and moving the turntable 76 away from the cartridge 6.

When the outer holder 3 is further pulled out, the stopper 33 moves out of the path of pivotal movement of the kickout lever 8 as shown in FIG. 12 (a), permitting the tension spring 85 to rotate the lever 8 clockwise. The push lug 80 of the lever 8 delivers the cartridge 6 from the inner holder 2 under the action of the tension spring 85.

Since the inner holder 2 is attached through the chassis 1 to the cabinet 4, there is no need to give a large upper surface to the inner holder 2.

Furthermore, loading of the cartridge 6 into the inner holder 2 automatically brings the head lever 7 close to the cartridge 6, whereby the head 70 is made ready to record data on the disk. Accordingly, there is no need to additionally provide a mechanism for moving the head lever 7 upward and downward. This results in a reduction in the number of components.

Further with the mechanical deck 100 of the present device, the tension spring 85 biases the turntable 76 toward the cartridge 6 for recording and pushes the cartridge 6 for delivery from the deck. Thus, the single tension spring 85 acts to deliver the cartridge 6 from the device and to hold the cartridge 6 in the recording position. This serves to reduce the number of components.

Although portions of the cabinet 4 are inserted through the holes 14 or cutouts 13 according to the present embodiment, the legs 25 of the inner holder 2 may alternatively extend through the holes 14 or cutouts 13.

#### Claims

1. A disk recording device wherein a mechanical deck 100 is provided inside a cabinet 4, the mechanical deck 100 comprising an inner holder 2 for horizontally holding therein a cartridge 6 containing a disk 60, a chassis 1 movable toward and away from the inner holder 2 and provided with a pickup 75 movable toward the disk, and an outer holder 3 provided over the inner holder 2 and slidable along the direction of insertion of the cartridge, the cartridge 6 being insertable into the cabinet 4 through a front opening thereof, the disk recording device being characterized in that:

the outer holder 3 is formed with cam slots 30 for moving the inner holder 2 and the chassis 1 toward and away from each other with the sliding movement of the outer holder 3, the inner holder 2 being fixed to the cabinet 4 through holes 14 and cutouts 13 formed in the chassis 1, the chassis 1 being movable upward and downward relative to the inner holder 2 along the cam grooves 30, a space 44 for accommodating the pickup 75 being formed between a lower surface of the chassis 1 and a bottom surface of the cabinet 4 when the chassis 1 is in a completely lowered position.

2. A disk recording device according to claim 1 wherein a pivotal panel 42 pushable inward by the cartridge 6 is pivoted at an upper end thereof to an opening-defining front portion of the cabinet 1, and held completely open by the contact of a lower end of the panel 42 with an upper surface of the cartridge 6, with a rear end face of the cartridge 6 exposed from the front opening of the cabinet 4, when the cartridge 6 is loaded in position.
3. A disk recording device comprising an inner holder 2 for a cartridge 6 containing a disk 60 to fit in, the inner holder 2 being provided with a chassis 1 having a pickup 75 and movable toward and away from the holder 2, and an outer holder 3 provided over the inner holder 2 and slidable along the direction of

loading or unloading of the cartridge, one of the outer holder 3 and the chassis 1 being formed with cam slots 30 for moving the inner holder 2 and the chassis 1 toward each other with the sliding movement of the outer holder 3, the other of the outer holder 3 and the chassis 1 being provided with cam followers fitting in the respective cam slots 30, the pickup 75 having pivotally attached thereto a head lever 7 movable toward the disk 60 within the cartridge 6 through the inner holder 2, the disk recording device being characterized in that:

the inner holder 2 is provided with a head drive lever 5 positioned under the head lever 7 and pivotally movable in the same plane as the head lever 7, the outer holder 3 being formed with a protrusion 34 for pivotally moving the head drive lever 5 in a direction to push up the head lever 7 when the inner holder 2 is in a standby position with no cartridge loaded therein, the head drive lever 5 being releasable from the protrusion 34 by the sliding movement of the outer holder 3 to permit the head lever 7 to pivotally move toward the cartridge 6.

4. A disk recording device according to claim 3 wherein the cartridge 6 is provided with a shutter 61 for opening or closing the disk, and the shutter 61 is in a completely open state when the cartridge 6 is loaded in the inner holder 2.
5. A disk recording device comprising as housed in a cabinet 4 an inner holder 2 for a cartridge 6 containing a disk 60 to fit in, an outer holder 3 provided over the inner holder 2 and slidable in the direction of insertion of the cartridge, and a chassis 1 disposed below the inner holder 2 and provided with a turntable 76, the chassis 1 and the inner holder 2 being movable toward and away from each other, the inner holder 2 having pivoted thereto a kickout lever 8 for biasing the cartridge 6 in the direction of delivery from the inner holder, the disk recording device being characterized in that:

the chassis 1 and the inner holder 2 are in engagement with each other through cam slots 30 formed in side walls of the outer holder 3, the inner holder being fixed to the cabinet 4, the chassis 1 being movable upward and downward relative to the inner holder 2, a tension spring 85 being provided between and engaged with the outer holder 3 and the kickout lever 8 for biasing the kickout lever 8 toward the direction of delivery of the cartridge, the kickout lever 8 being in contact with the outer holder 3 and restrained from sliding in the direction of insertion of the cartridge when the

inner holder 2 is in a standby position with no cartridge inserted therein,

the kickout lever 8 being pivotally movable out of contact with the outer holder 3 to permit the tension spring 85 to slidably move the outer holder 3 toward the direction of insertion of the cartridge 6 and to raise the chassis 1 fitting in the cam slots 30.

6. A disk recording device according to claim 5 wherein the outer holder 3 has a manual piece 31 projecting out therefrom, and the outer holder 3, when pulled out toward the direction of delivery of the cartridge, lowers the chassis 1 fitting in the cam slots 30 to move the turntable 76 out of contact with the cartridge 6, and permits the kickout lever 8 to kick out the cartridge 6 toward the direction of delivery under the action of the tension spring 85.

FIG. 1

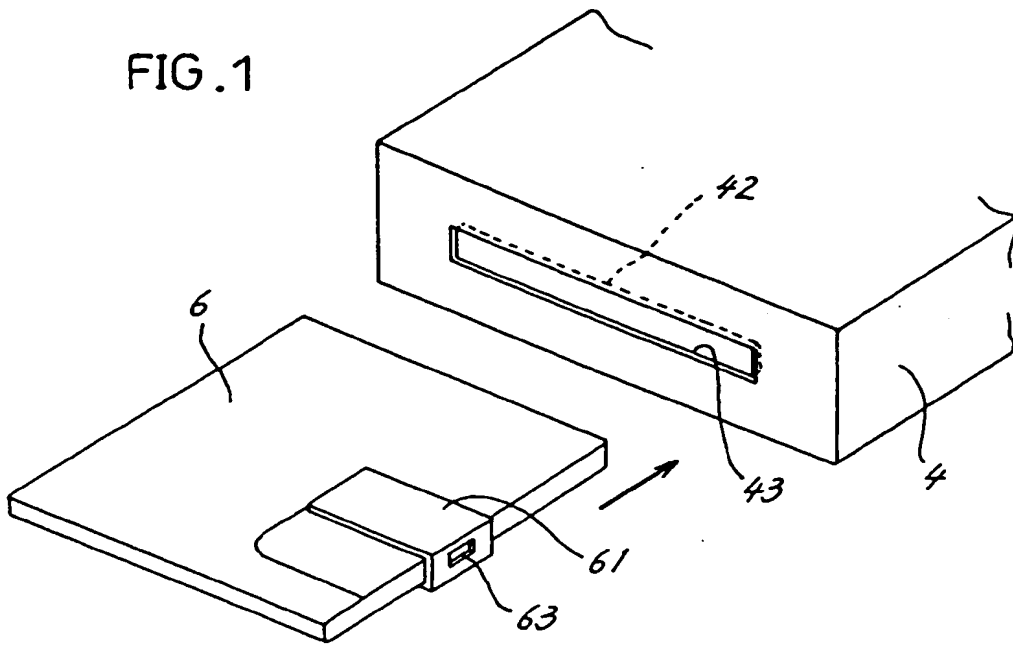


FIG. 2A

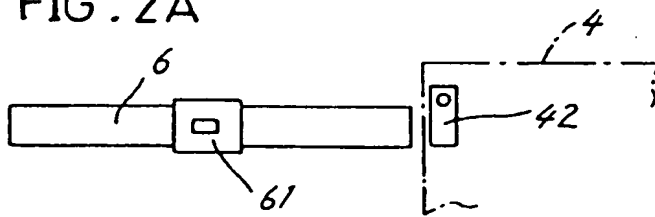


FIG. 2B

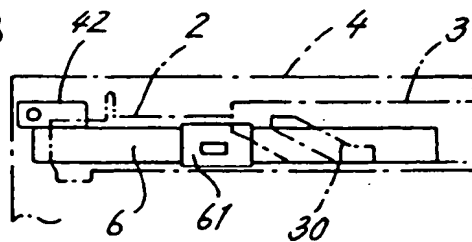




FIG. 3

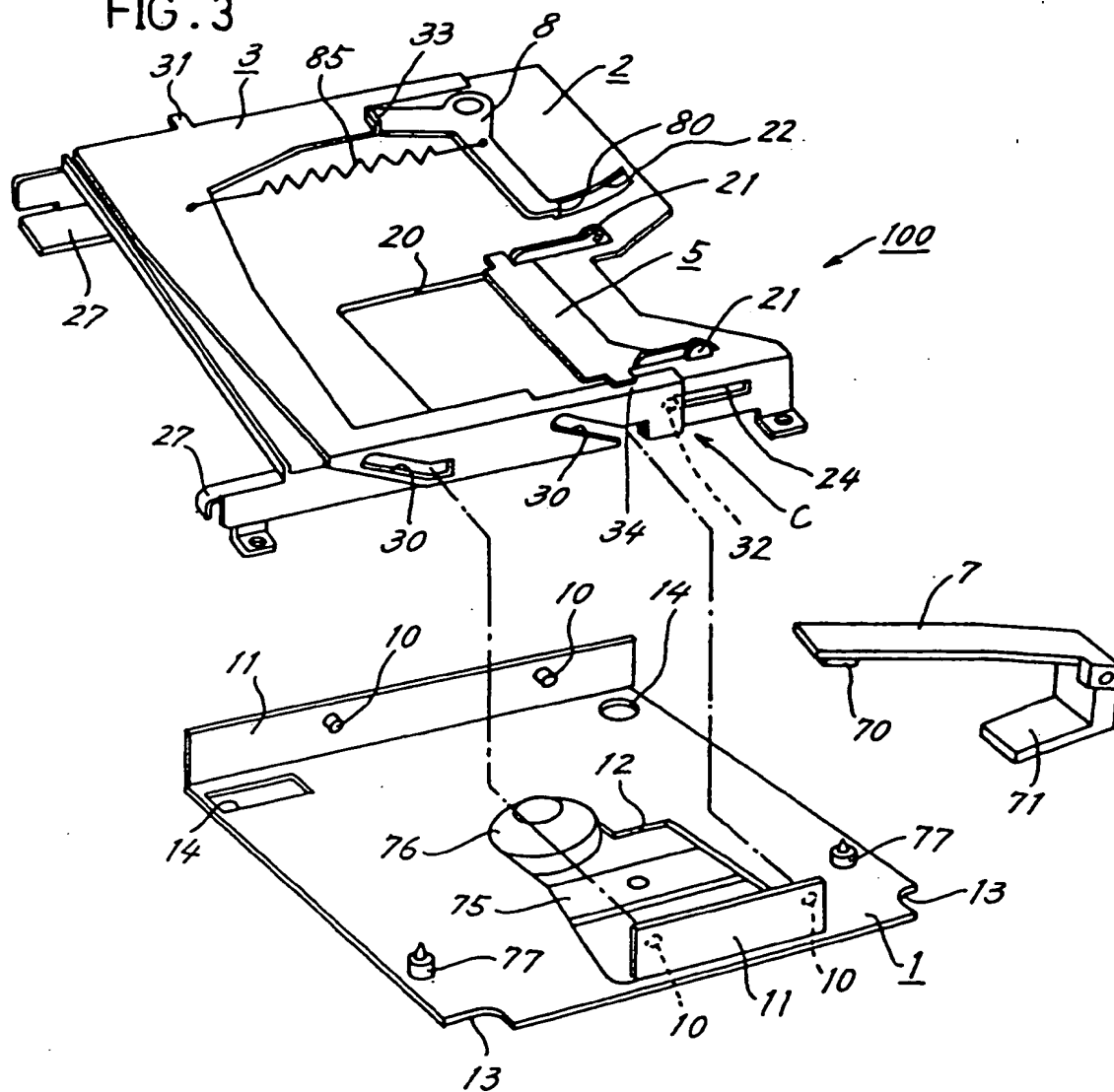


FIG. 4

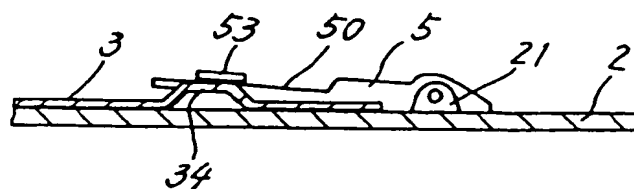


FIG. 5

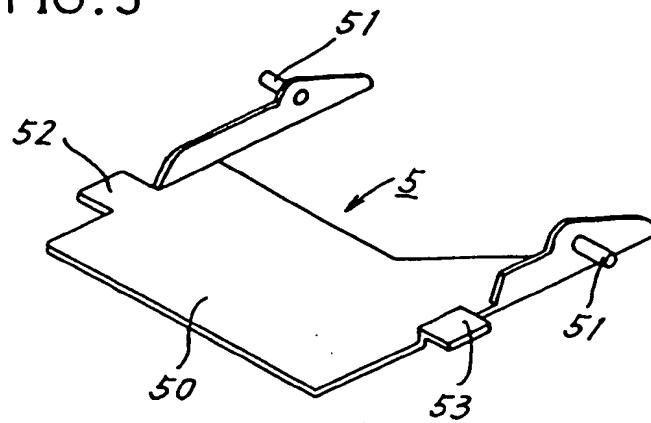


FIG. 6

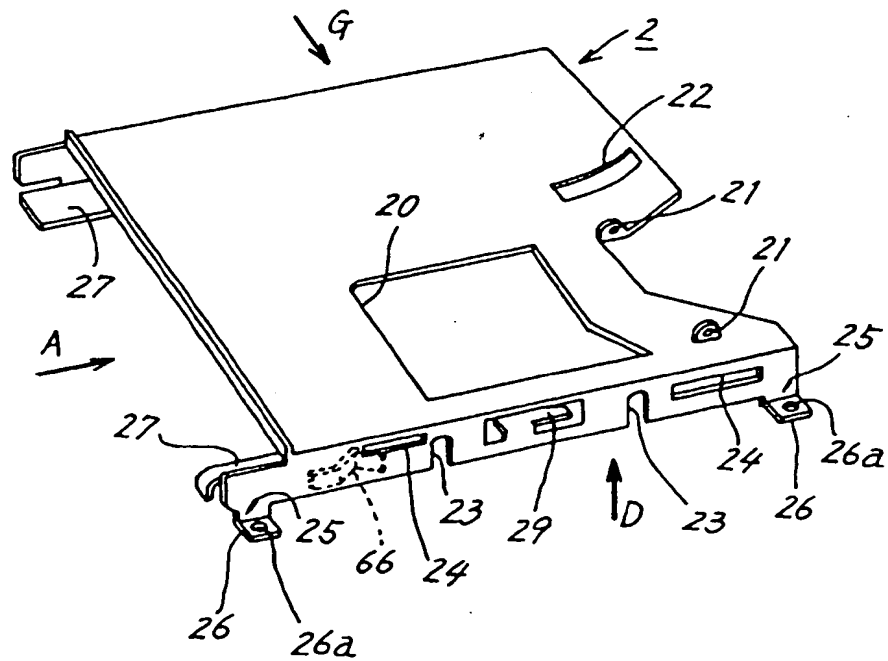


FIG. 7

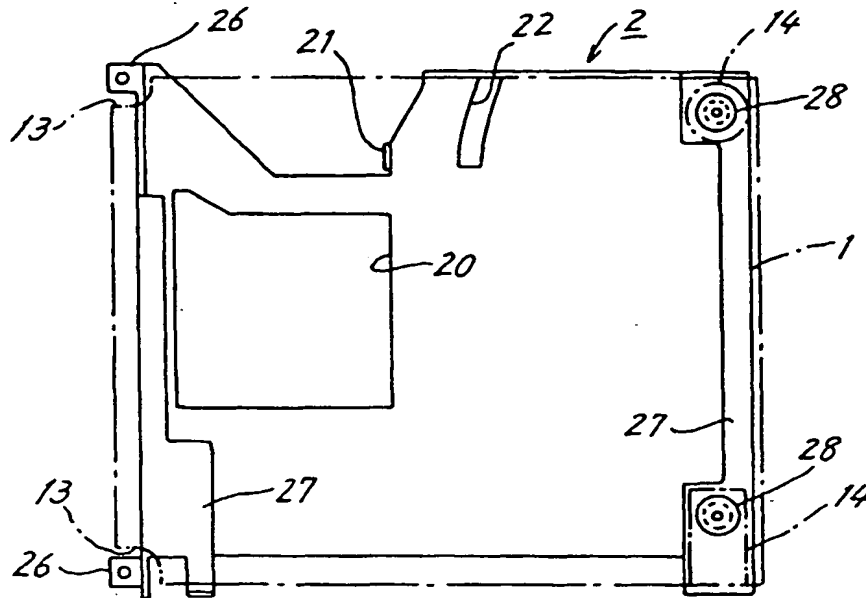


FIG. 8

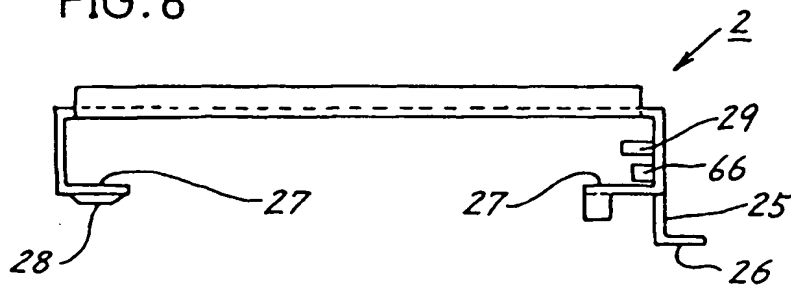


FIG. 9

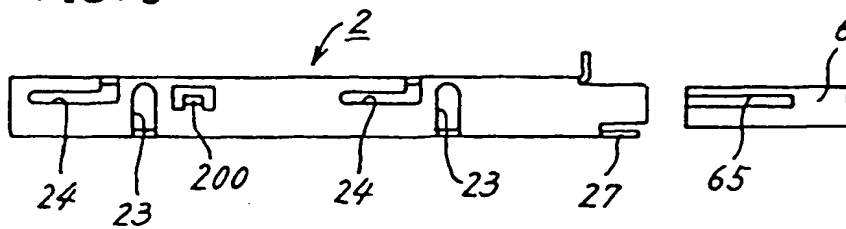


FIG. 10

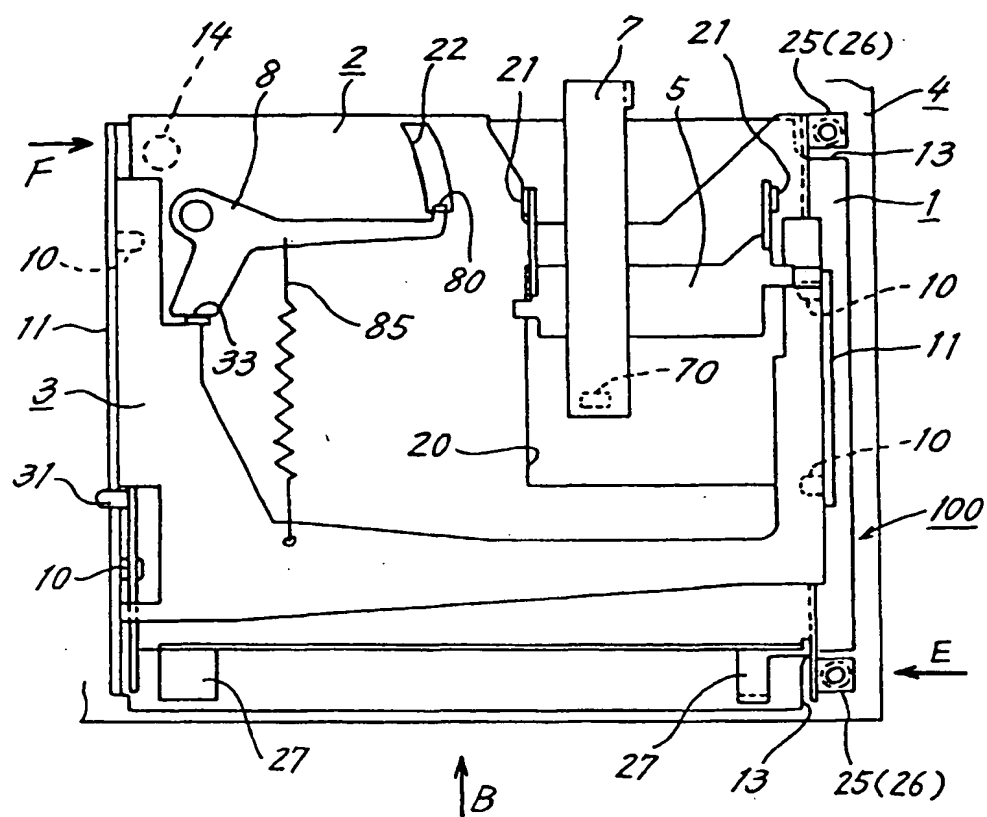


FIG. 11

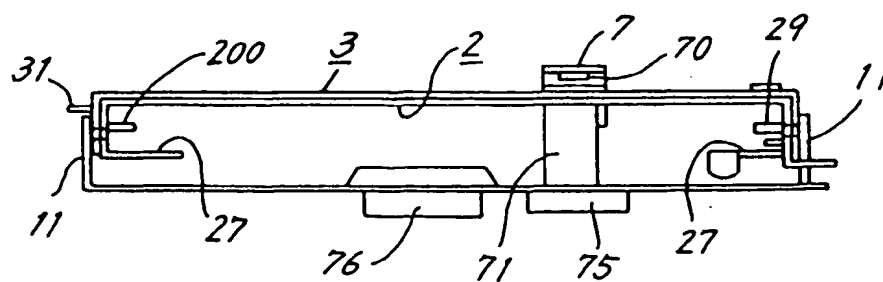


FIG. 12A

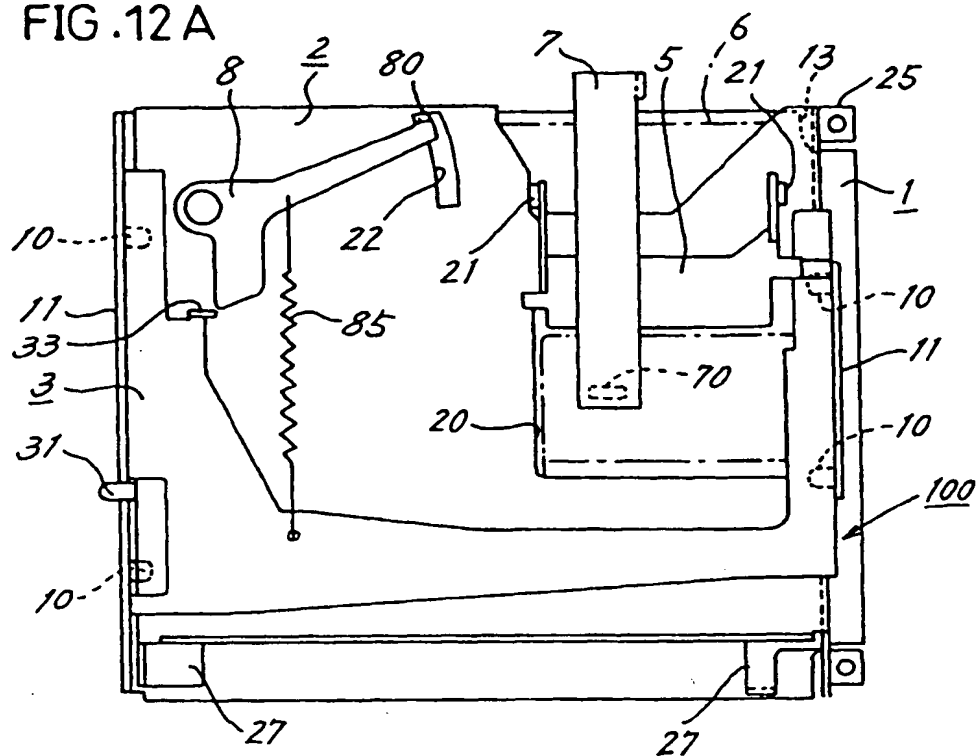


FIG. 12B

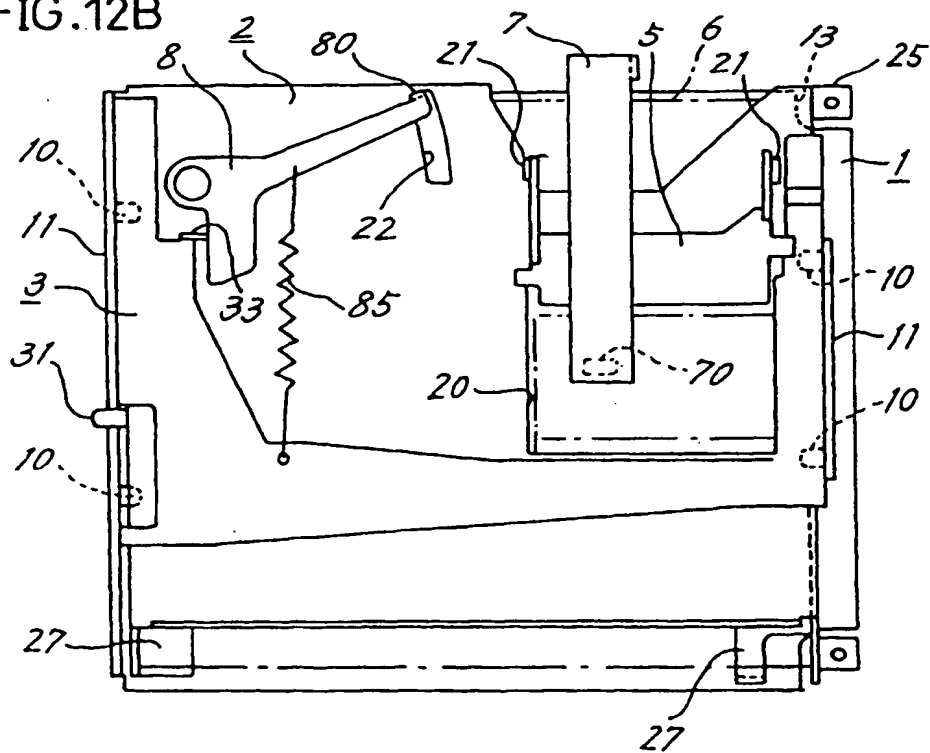


FIG.13A

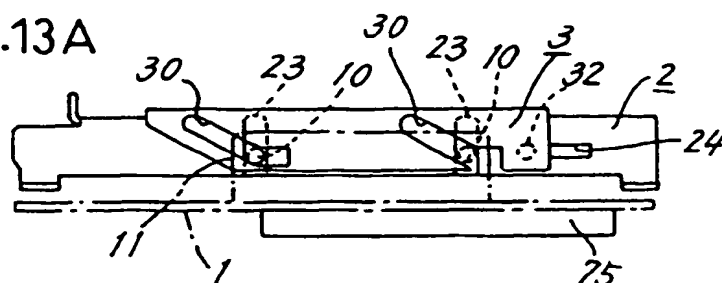


FIG.13B

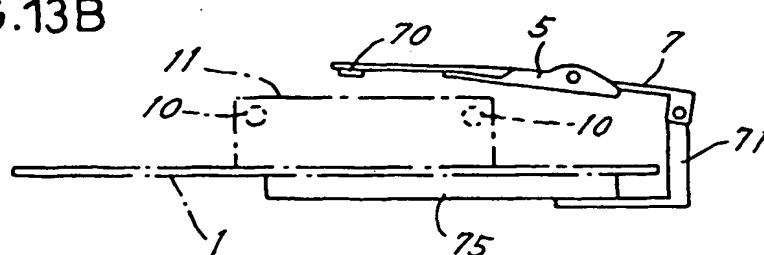


FIG.14A

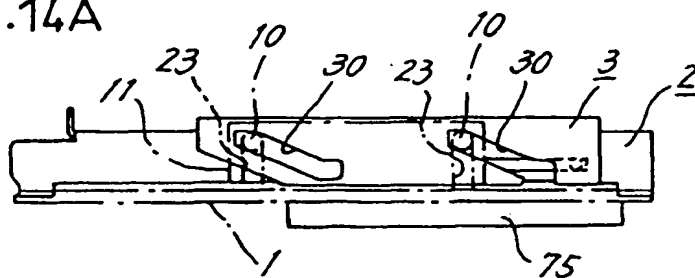


FIG.14B

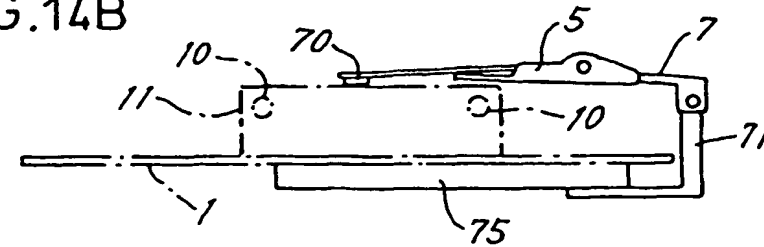


FIG.15

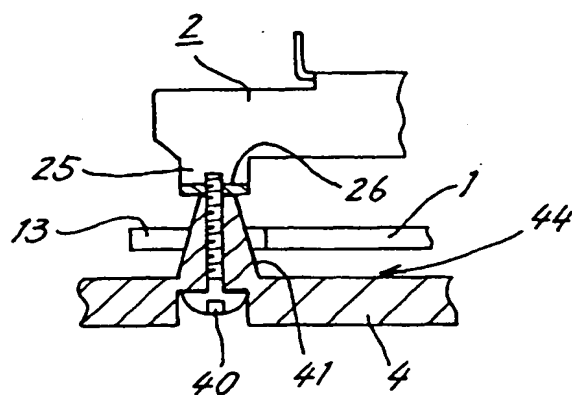


FIG.16

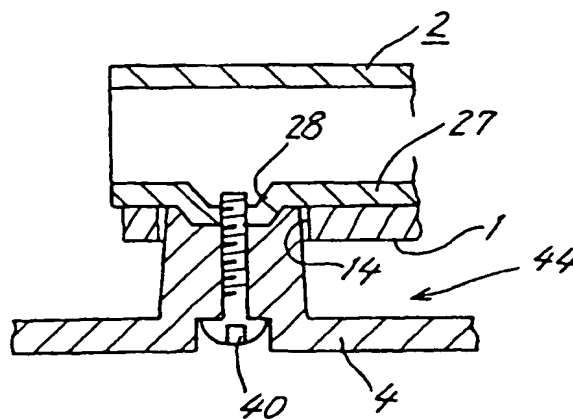


FIG.17 PRIOR ART

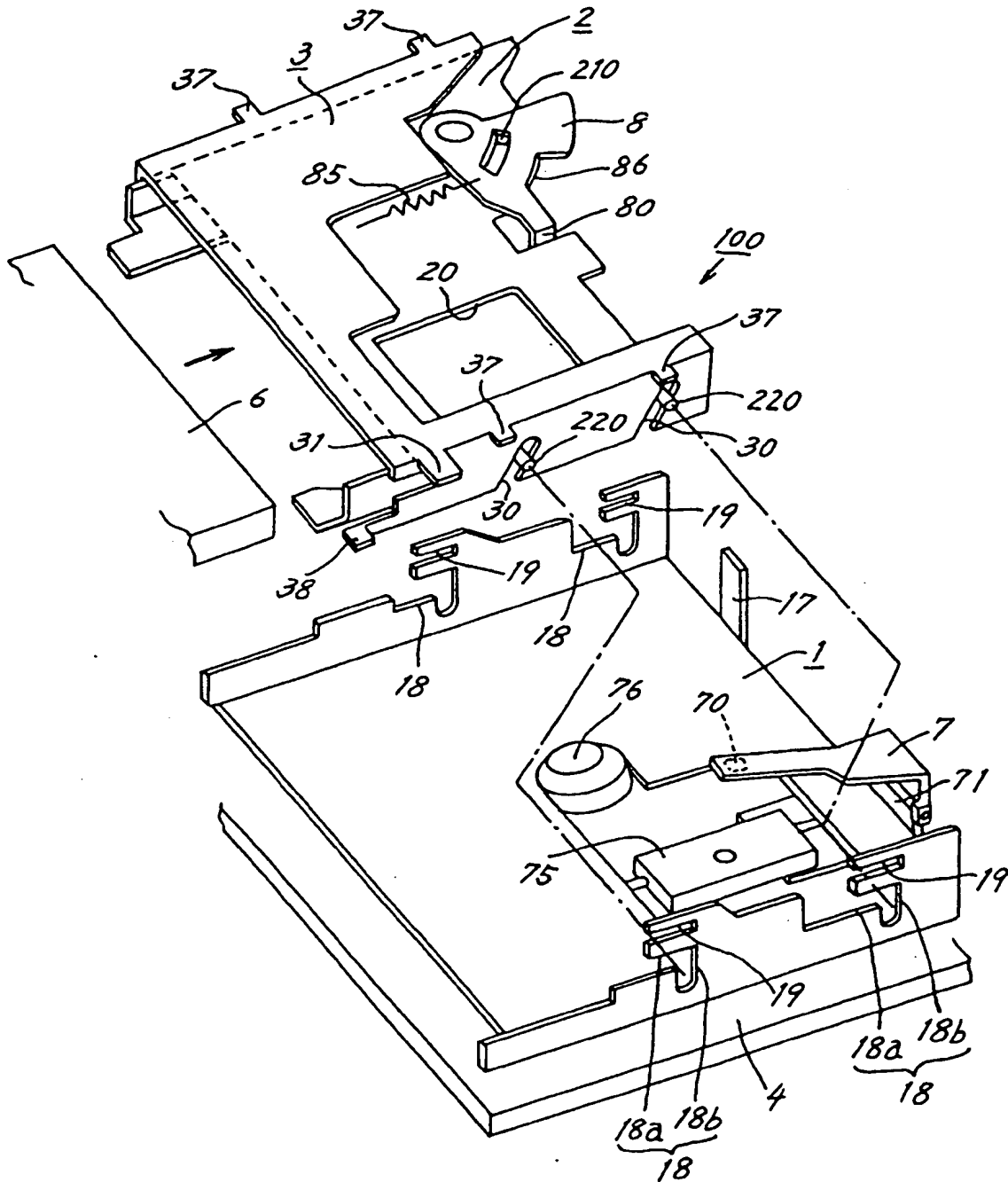




FIG.18A  
PRIOR ART

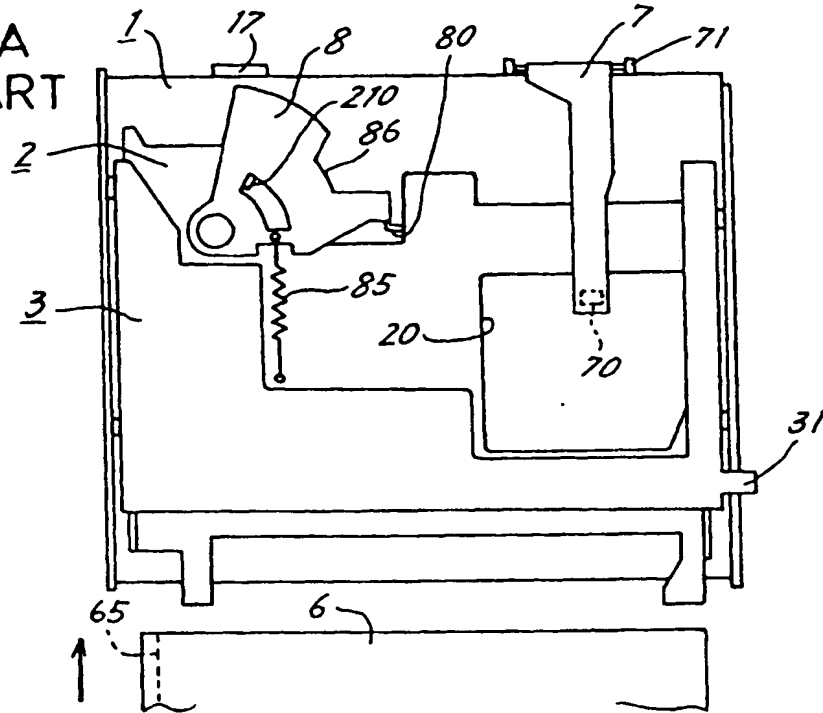


FIG.18B  
PRIOR ART

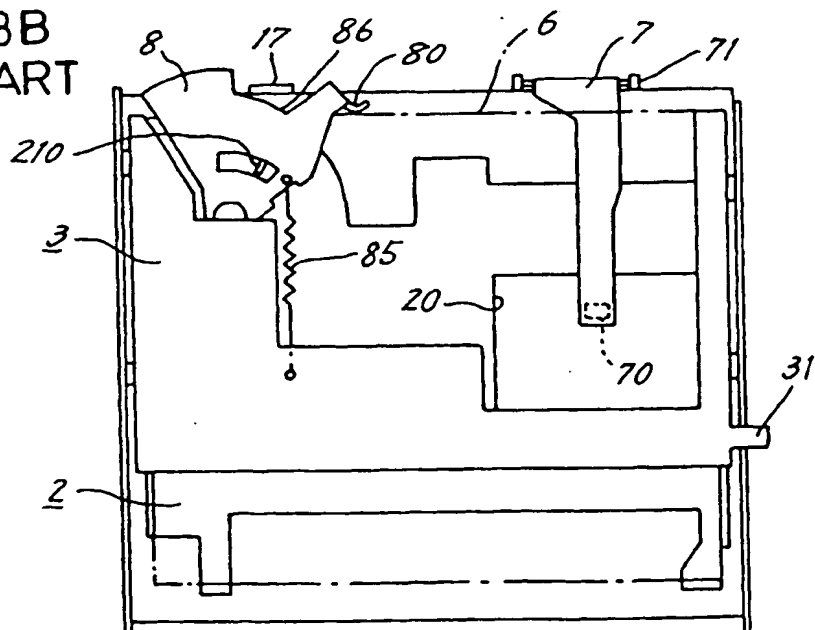


FIG.19A PRIOR ART

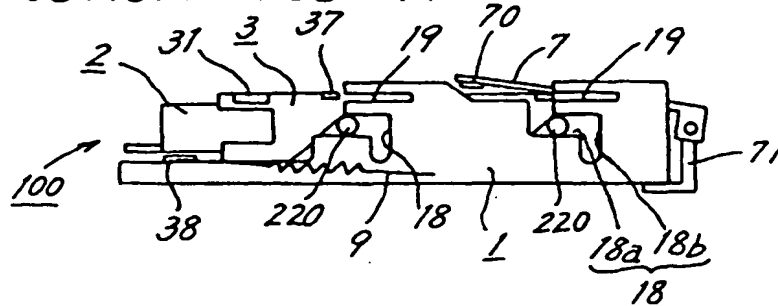


FIG.19B PRIOR ART

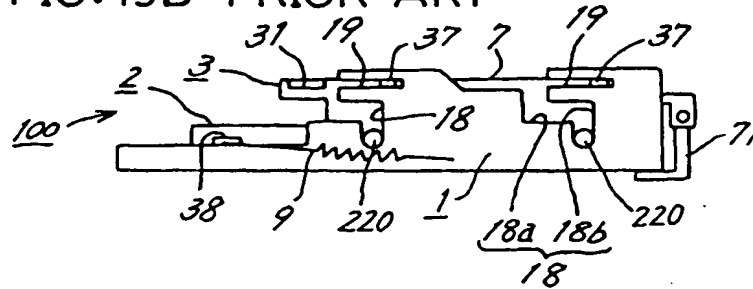


FIG.20A PRIOR ART

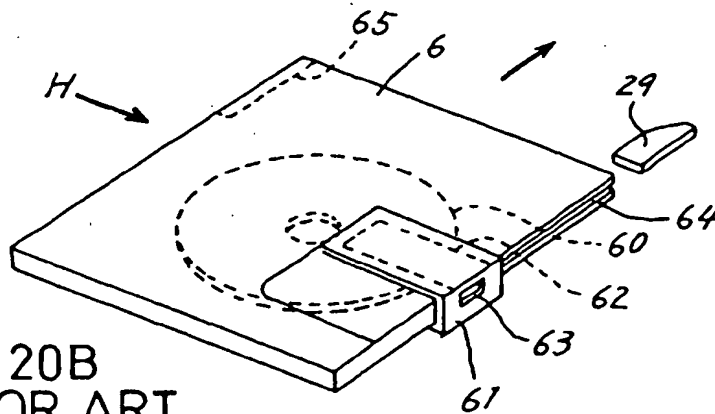


FIG.20B  
PRIOR ART

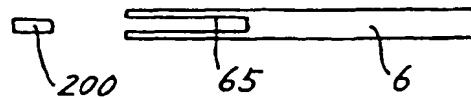


FIG. 21 PRIOR ART

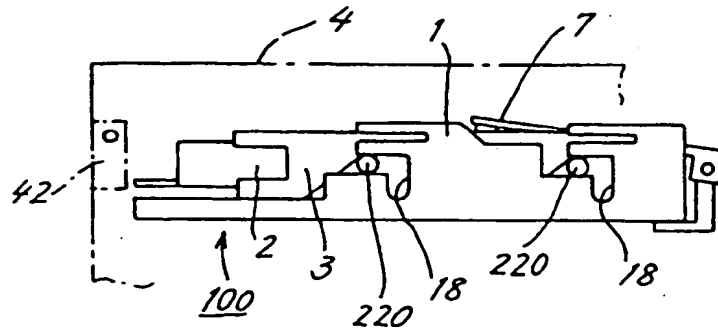


FIG. 22A  
PRIOR ART

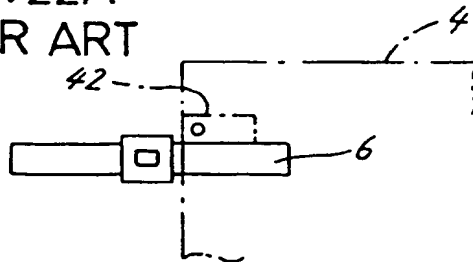
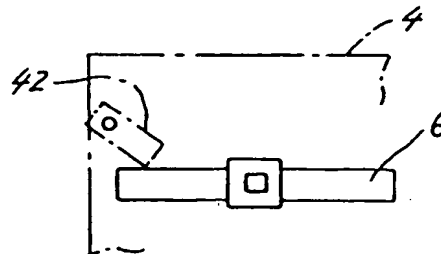


FIG. 22B  
PRIOR ART





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 98 11 1011

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 4 774 608 A (HORIUCHI HIROSHI ET AL) 27 September 1988 * column 3, line 34 - column 5, line 62 *	1,3,5	G11B17/04
A	EP 0 501 337 A (SONY CORP) 2 September 1992 * column 7, line 38 - column 8, line 56 *	1,3,5	
A	EP 0 482 585 A (SONY CORP) 29 April 1992 * column 23, line 20 - column 28, line 39 *	1,3,5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			G11B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 September 1998	Examiner Ressenaar, J-P
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non written disclosure P : intermediate document			

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